

What is claimed is:

1. A semiconductor device comprising:

a semiconductor element;

5 a support member having a recess for housing the semiconductor element, the support member including lead electrodes and a support part holding the lead electrodes so that a surface of each of the lead electrodes is exposed in a bottom of the recess; and

10 wherein the support member has at least a first surface disposed adjacent to the recess and a second surface disposed adjacent to and offset from the first surface.

2. A semiconductor device comprising:

15 a semiconductor element;

a support member having a recess for housing the semiconductor element, the support member including lead electrodes and a support part holding the lead electrodes so that a surface of each of the lead electrodes is exposed in a bottom
20 of the recess;

wherein the support member has at least a first surface disposed adjacent to the recess and a second surface disposed adjacent to and offset from the first surface, the second surface

having at least one of a protrusion and a further recess disposed thereon.

3. The semiconductor device according to claim 2, wherein
5 the further recess is a depression and the protrusion forms an outer wall of the depression.

4. A semiconductor device comprising:

a semiconductor element;

10 a support member having a recess for housing the semiconductor element, the support member including lead electrodes and a support part holding the lead electrodes so that a surface of each of the lead electrodes is exposed in a bottom of the recess;

15 wherein the support member has at least a first surface disposed adjacent to the recess and a second surface disposed adjacent to and offset from the first surface of the support member; and

wherein the semiconductor element comprises a semiconductor
20 having a laminated structure with at least a N-type contact layer of a nitride semiconductor having an N-side electrode and a P-type contact layer of the nitride semiconductor having a P-side electrode, the N-type contact layer comprises a first region

including a semiconductor laminated structure having a P-side electrode, and a second region including a plurality of protrusions, when viewed from an electrode forming face side; and wherein a top portion of the protrusions is closer to a level of the P-type contact layer than a level of an active layer as viewed along a cross sectional view of the semiconductor element.

5. The semiconductor device according to claim 4, wherein the second surface has a surface protrusion and a further recess disposed thereon, the further recess is a depression and the surface protrusion forms an outer wall of the depression.

6. An optical device comprising:
a semiconductor device including
a semiconductor element;
a support member having a recess for housing the semiconductor element, the support member including lead electrodes and a support part holding the lead electrodes so that a surface of each of the lead electrodes is exposed in a bottom of the recess, the support member has at least a first surface disposed adjacent to the recess and a second surface disposed adjacent to and offset from the first surface;
a translucent member for allowing light to exit from the

semiconductor device, or for allowing light to be received by the semiconductor device, the translucent member having a light entrance portion and a light emitting portion.

5 7. An optical device comprising:
a semiconductor device including
a semiconductor element;
a support member having a recess for housing the
semiconductor element, the support member including lead
10 electrodes and a support part holding the lead electrodes so that
a surface of each of the lead electrodes is exposed in a bottom
of the recess, the support member having at least a first surface
disposed adjacent to the recess and a second surface disposed
adjacent to and offset from the first surface, the second surface
15 having a protrusion and a further recess disposed thereon; and
a translucent member for allowing light to exit from the
semiconductor device, or for allowing light to be received by the
semiconductor device, the translucent member having a light
entrance portion and a light emitting portion.

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8. The semiconductor device according to claim 7, wherein
the further recess is a depression and the protrusion forms an
outer wall of the depression.

9. An optical device comprising:

a semiconductor element comprises at least one of:

a fluorescent material containing Al and at least one element selected from Y, Lu, Sc, La, Gd, Tb, Eu, Ga, In, and Sm;

5 and activated with at least one element selected from the rare earth elements, and

a fluorescent material containing N, at least one element selected from Be, Mg, Ca, Sr, Ba, and Zn; and at least one element selected from C, Si, Ge, Sn, Ti, Zr, and Hf; and

10 activated with at least one element selected from the rare earth elements.

10. A semiconductor device comprising:

a semiconductor element;

15 a support member having a recess for housing the semiconductor element, the support member including lead electrodes operatively connected by a conductive member to the semiconductor element, wherein the support member has at least a first surface disposed adjacent to the recess and a second
20 surface disposed adjacent to and offset from the first surface;
and

a sub-mount substrate disposed in the recess and the semiconductor element being disposed on the sub-mount substrate.

11. A method of making a semiconductor device comprising the steps of:

providing a molding die;

5 placing at least two lead electrode portions in the molding die;

supplying a molding member to the molding die so that the molding member contacts the portion of at least two lead electrode portions;

10 heating the molding member in the molding die so as to cure the molding member into a package with the portion of at least two lead electrode portions; and

removing the package from the molding die by a pushing member such that at least one of a protrusion and a recess are
15 formed in a surface of the package.

12. A method of making a semiconductor device as defined in claim 11, further comprising the step of:

forming a lead frame having a plurality of lead electrode
20 portions prior to said step of placing at least two lead electrode portions in a molding die.

13. A method of making a semiconductor device as defined in

claim 11, wherein the step of providing a molding die includes providing a molding die having at least two offset surfaces so that a first main surface and a second main surface are formed in the package during said step of heating, and wherein said
5 step of removing the package from the molding die by a pushing member forms the at least one of a protrusion and a recess in the second main surface of the package.

14. A semiconductor device comprising:

10 a semiconductor element;

a support member having a recess for housing the semiconductor element, the support member including lead electrodes and a support part holding the lead electrodes so that a surface of each of the lead electrodes is exposed in a bottom
15 of the recess; and

wherein the support member has at least a first surface disposed adjacent to the recess, the first surface having at least one of a protrusion and a further recess disposed thereon.

20 15. A semiconductor device set forth in claim 14, wherein said first surface includes the protrusion disposed on an end.

16. A semiconductor device set forth in claim 14, wherein

said first surface includes the further recess having a circular cross section.

17. A semiconductor device set forth in claim 14, wherein
5 said first surface includes the protrusion having a circular cross section.

18. A semiconductor device set forth in claim 14, further comprising a second surface adjacent to the first surface and
10 said second surface being angularly offset from the first surface.

19. A semiconductor device set forth in claim 14, wherein said first surface includes the further recess angularly
15 extending between opposed surfaces of the semiconductor device.